Impact of E-learning factors on Student Satisfaction:
Sohar University - a Case study

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Abstract

Purpose of the study: The study aimed to investigate the impact of quality remote e-learning factors on student satisfaction.

Design/Methodology/Approach: The random sampling method was adopted through a questionnaire in an online survey. The survey used a questionnaire to collect data from 218 students who had experienced online learning. Statistical Package for Social Sciences (SPSS) was used to analyse and interpret the collected data.

Findings: The study revealed that there was an impact of Information Quality, Service Quality, and System Usage on System Success which in turn has an impact on student satisfaction. It is observed that the experience through the e-learning system determines improvement towards academic knowledge and expertise.

Practical Implications: The study showed that most of the students opined that the Higher Education Institutions (HEIs) should keep improving their services as it is required to enhance the features and the facilities to increase student satisfaction.

Social Implications: This study helps HEIs to understand the student's perception of remote e-learning systems for future improvements. This study has provided insights into remote e-learning systems of higher education institutions in understanding the impact of the system used on student satisfaction. This will help them to improve the e-learning system.

Originality/value: No study has ever considered the three key factors which influence the system usage which in turn affects student satisfaction and this research dealt with that.

Keywords: E-learning difficulties, Information Quality, System Quality, System Usage, System Success, Student Satisfaction.

Introduction

E-learning is a substitute for the traditional way of face-to-face education and allows the students to learn without time constraints and geographic limitations (Al-Samarraie et al., 2018). Its main feature of offering versatile and tailored learning makes online-learning a highly desired mode of learning (Clayton *et al.*, 2018). Remote e-Learning has become popular worldwide in light of the spread of the Coronavirus pandemic. The application of remote e-learning works to diagnose the educational needs of academics, formulate educational goals well, and determine the priorities in learning to select the most appropriate strategies and tools appropriate in learning and other good frameworks. The advancement of telecommunications technology has contributed to the development of learning through e-learning, which has significantly changed the learner's learning experience (Aparicio, Bacao, & Oliveira, 2017). The closure of education facilities is the contagion effect of the latest coronavirus. To resolve the situation of the closure of the educational institutions, UNESCO has recommended that the educational institutions need to prepare them with resources for online learning (Crawford et al., 2020).

E-learning platforms must effectively implement features that confirm the long-term use of innovation and information technology. Effective e-learning was discussed and investigated earlier in several studies, including the rapid growth in e-learning, especially in universities (Loh et al., 2016). However, the quality of different frameworks and the positive and negative influences presented by the remote e-learning system, especially through the use of student resources proposed by the Universities is unknown. Thus, the research aims at answering the following research question viz. What was the impact of quality remote e-learning factors on student's satisfaction?

Therefore, this research focuses on the importance of e-learning study, and the number of students satisfied through the system. Hence, the research objective of the study was to investigate the impact of quality remote e-learning factors on student satisfaction. Therefore, the study has also attempted to bring out the extent of students' evaluation of remote e-learning and how they deal with the systems of direct electronic lectures after their usage.

It is learned that there is a significant gap between student experience and remote e-learning system and there is a need to evaluate the implementation process of remote e-learning that can lead to a comprehensive change in the educational system at present. Measuring student's satisfaction with remote e-learning system is important to understand the extent of students' preparations and their capabilities to deal with these systems that need to the comprehensive plan and arrange, given that the mechanisms for using the default application of students proposed by the universities are new applications that need to be studied thoroughly. So, this study evaluated the system's success and used it to improve the system to a higher quality so as the flexibility of the e-learning system could be enhanced. This study deals with the students' perception of remote e-learning framework and the understanding of students and their satisfaction with remote e-learning using the system. The study tested the impact of remote e-learning on student satisfaction which leads to system success.

Review of Literature

Information Quality
For education institutions, the importance of having information systems not only comply with all the functional requirements but produce high-quality information particularly recognizable (Mavetera & Lubbe, 2017). The remote e-learning system is very important to students so that they can access not only all available course information, but also the institutional relationship with their university (Martins et al., 2019). Electronic information had a major, positive impact on student learning as investigated in previous studies (Mammo & Ngulube, 2019). Services provided form the basis for the perception that all service quality characteristics do not affect the overall quality of service provided to students (Alkhalaf et. al., 2013). The key benefits of the quality of information include precision, wholeness, sufficiency, usability, understandability, timeliness, and design (Ghazal et. al., 2017).

The quality of information has a major effect on the use and satisfaction of students, such as the content of courses (Aparicio et al., 2017). Higher the quality of e-information provided, greater the e-learning of students and to ensure a better student e-Learning system, better the quality of e-information must be provided (Shehzadi et al., 2020). Gay (2016) confirmed the importance of quality of knowledge in characterizing the suitability of online environments, which are crucial for the satisfaction of technology instructors. When you consider the system quality to be high, you will consider that such a system is critical and useful in carrying out (Al-Samarraie et al., 2018).

Quality of knowledge has the most direct effect on user satisfaction, as obtained by (Al-Fraihat et. al., 2020).

Service Quality
Quality of service refers to the quality of support services offered to end-users of the system (Ghazal et al., 2017). Zhou (2013) argued that quality assurance is even more important in online services and platforms than in conventional services. From the perspective of Bessa et. al. (2016), services linked to information transfer must be of the highest quality because of the need for reliable services ensuring continuous success presented both to internal and external users (Martins et al., 2019). Universities should use e-services to improve the quality of their e-services, which in the current lockdown situation is helpful for e-learning among universities to support paradigm shift as it is claimed that to facilitate student e-learning, the standard of e-services must be observable, effective, sensitive, and secure (Shehzadi et al., 2020). It is also expected that the delivery of the e-learning system, will have a positive impact on their understanding and satisfaction (Al-Fraihat et al., 2020). If e-service offers low service quality, the level of satisfaction will be reduced (Ahmed & Khanum, 2020).

System Usage
When students notice that the e-learning systems provide easy access to the subject contents, and the platform is well organized and easy to navigate, the e-learning system usage is increasing, and students are encouraged to use the e-learning facilities which results in efficiency on students' understanding of the subject contents, improved knowledge and successful completion of their assignments and assessments on the e-learning system (Aparicio et al., 2017). According to Cidral et. al. (2018) and Selvaraj (2019), user satisfaction and usage of e-learning have a huge influence on students' performances. But after the COVID-19 outbreak and the closure of higher education institutions the students' usage of e-learning platforms has increased a lot (Shahzad et. al., 2020). Students' usage might also be affected by problems of hardware, software, and network outside of e-learning control.

Impact of E-learning on Student Satisfaction

Student's ability to cope up with the e-learning environment is a factor that affects system usage as students need skills and knowledge for the optimal usage of the system as these skills extend self-efficacy in managing their work (Freeze et al., 2019).

Student satisfaction

Student satisfaction is a popular indicator of the success of university educational websites (Shehzadi et al., 2020). Efficient student satisfaction occurs when information and knowledge gained have the same quality as students predicted and it has a positive impact on student mentality (Dominici & Palumbo, 2013). When students see the e-learning system as reliable, accurate, readable, modified, and well-formatted material of the courses, they will find the training systems more useful and satisfying. A sense of unacceptability and insufficiency can inhibit the motivation of students to continue their combined learning (Ghazal et al., 2017). The satisfaction of the student is a judgment that the quality of information and knowledge meet the standards of students' expectation and thus e-learning will increase students learning performance and thus enhance students' efficiency (Shehzadi et al., 2020). Oduma et. al. (2019) stated that the highest standard of e-learning education will help universities improve student satisfaction. Student satisfaction is the key to optimize the sustainability of all education institutions through the creation and preservation of student attitudes and objectives (Yilmaz, 2017).

System Success

The characteristics of e-learning systems influence system effectiveness; however, it is important to analyze students' readiness towards e-learning (Kurt, 2019). Freeze et al. (2019) stated that user satisfaction had a greater effect on system performance compared to system use. There will be positive effects as both user satisfaction and system use creates an impact on system performance (Kurt, 2019). The system users describe the effectiveness of the system as beneficial as the students are pleased with the system's influence on their learning knowledge and thus consider the system to be successful (Mohammadi, 2015).

Based on the above discussions, the three variables viz. information quality, service quality, and system usage were considered that impact system success (acceptance) and student satisfaction. Consequently, this study categorized critical factors for student satisfaction and acceptance of remote e-learning. Based on the earlier study by Cidral et al. (2018), the definitions of the selected variables were as follows:

Information Quality: The system information should be considered as of quality when the material is valuable, accurate, complete, and comprehensible.
Service Quality: Quality of service relates to the reactivity and empathy of support personnel from the system network and the expertise of responsible service staff.
System Usage: Tests the level of usage of the information system to carry out learning tasks.
System Success: A good system depends on the concert, availability, and usability of the system.
Student Satisfaction: The view of students on how the devices comprehend their user experience.

Research Methodology

The population was the students who were studying at Sohar University (6,800 registered students), Oman who were using the remote e-learning system. As per the recommendation of Ruane (2005), if the population of the study is less than 10,000, a sample of 250 is considered as an adequate sample for social science research. So, the random sampling method was adopted through a questionnaire, and data was collected from 218 students. The questionnaire had two parts. The first part consisted of demographic information. The second part comprised the information quality, service quality, system use, and student satisfaction. Likert Scale was used to collect the data. All the questions of the questionnaire were adopted from Aparicio et al. (2019) and Kurt, (2019). SPSS was used to analyse the data and interpret it.

Findings

Table.1 Demographic details of the respondents

Characteristics		Frequency	%
Gender	Male	76	34.9
	Female	142	65.1
Educational Level	Diploma	103	47.2
	Higher Diploma	19	8.7
	Bachelors	68	31.2
	Master and above	28	12.8
Educational Institution	Public	155	71.1
	Private	63	28.9

Students belonging to Higher Education	Yes	172	78.9
	No	46	21.1
Are you using a remote e-learning system	Yes	201	92.2
	No	17	7.8

Source: Questionnaire

Table 2. Reliability Statistics

	Cronbach's Alpha	N
Information Quality	.795	5
Service Quality	.812	5
System Usage	.778	4
System Success	.822	5
Students Satisfaction	.801	4

Table.2 shows that the alpha of Cronbach of the independent variables is greater than 0.70 and has internal consistency. Thus the independent variables can be considered ideal for further analyses.

Table 3. Information Quality

Statement	SD	D	N	A	SA	K-S value	χ^2	p-value
The system offered data that was needed	46 21.1%	40 18.3%	59 27.1%	54 24.8%	19 8.7%	0.163	22.229	.000
The system contains data that is related to learning	26 11.9%	27 12.4%	54 24.8%	96 44.0%	15 6.9%	0.265	97.642	.000
The system provided appropriate information	40 18.3%	46 21.1%	62 28.4%	57 26.1%	13 6.0%	0.171	33.789	.000
The system offered details that can be easily clarified	51 23.4%	48 22.0%	54 24.8%	54 24.8%	11 5.0%	0.161	31.037	.000

From Table.3, it was observed that the p-value was less than 0.05. Therefore, comparing the K-S values obtained from the Kolmogorov-Smirnov test, it was observed that 'The system contains data that is related to learning' ranked first, followed by 'The system gives appropriate information' and 'the system offers data that is everything you need'.

Table.4 Service Quality

Statement	SD	D	N	A	SA	K-S value	χ^2	p-value
Whenever needed assistance in e-learning system, the professional services staff came for rescue	52 23.9%	42 19.3%	59 27.1%	55 25.2%	10 4.6%	0.174	35.991	.000
When faced with difficulties in the e-learning system, the professional services staff provided personal attention	45 20.6%	47 21.6%	56 25.7%	62 28.4%	8 3.7%	0.179	40.670	.000
Responsible staff performed system-related services within promised time	48 22.0%	46 21.1%	60 27.5%	56 25.7%	8 3.7%	0.176	39.339	.000
The professional services staff had enough experience to answer any questions in relates to the system	37 17.0%	45 20.6%	59 27.1%	63 28.9%	14 6.4%	0.181	35.211	.000

From Table.4, it was observed that the p-value was less than 0.05. Therefore, comparing the K-S values obtained from the Kolmogorov-Smirnov test, it was observed that 'The professional services staff had enough experience to answer the questions in relates to the system' ranked first followed by 'When faced with any issues related to the e-learning system, professional services staff provided personal attention' and 'Responsible services staff performed system-related services at the time promised'.

Table.5 System Usage

Statement	SD	D	N	A	SA	K-S value	χ^2	p-value
I used the system regularly	17 7.8%	32 14.7%	47 21.6%	107 49.1%	15 6.9%	0.297	130.532	.000
I was dependent on the system	16 7.3%	29 13.3%	60 27.5%	96 44.0%	17 7.8%	0.263	107.734	.000
I used the system only when it was necessary in learning	18 8.3%	37 17.0%	54 24.8%	94 43.1%	15 6.9%	0.262	95.532	.000

From Table.5, it was observed that the p-value less than 0.05. Therefore, comparing the K-S values obtained from the Kolmogorov-Smirnov test, it was observed that 'I use the system regularly' ranked first followed by 'I am dependent on the system' and 'I only use the system when it is necessary for learning'.

Table 6. Students Satisfaction

Statement	SD	D	N	A	SA	K-S value	χ^2	p-value
I do not have good opinion about how the system operates	51 23.4%	37 17.0%	48 22.0%	65 29.8%	17 7.8%	0.195	29.431	.000
I believe the system is useful	47 21.6%	37 17.0%	50 22.9%	70 32.1%	14 6.4%	0.204	38.284	.000
Overall I am happy with the system	58 26.6%	38 17.4%	48 22.0%	57 26.1%	17 7.8%	0.175	26.266	.000

From Table.6 it was observed that the p-value was less than 0.05. Therefore, comparing the K-S values obtained from the Kolmogorov-Smirnov test, it was observed that 'I believe the system is useful' ranked first followed by 'I do not have a good opinion about how the system operates' and each 'Overall I am happy with the system'.

Table 7. System Success

Statement	SD	D	N	A	SA	K-S value	χ^2	p-value
The system had a beneficial influence on learning	41 18.8%	28 12.8%	64 29.4%	68 31.2%	17 7.8%	0.195	45.165	.000
The system's output was fine	24 11.0%	36 16.5%	72 33.0%	64 29.4%	22 10.1%	0.186	48.881	.000
The system was reliable	50 22.9%	35 16.1%	56 25.7%	62 28.4%	15 6.9%	0.181	32.688	.000
The system quality was essential and useful in helping me towards success.	60 27.5%	29 13.3%	44 20.2%	70 32.1%	15 6.9%	0.210	45.807	.000

From Table.7, it was observed that the p-value was less than 0.05. Therefore, comparing the K-S values obtained from the Kolmogorov-Smirnov test, it was observed that 'The system quality was essential and useful in helping me towards success' ranked first, followed by 'The system had a beneficial influence on my learning' and 'The system's output was fine'.

Table 8. Correlation Analysis

	Information Quality	Services Quality	System Usage	Student Satisfaction	System Success
Information Quality	1				
Services Quality	.577**				
System Usage	.523**	.480**			
Student Satisfaction	.636**	.559**	.462**		
System Success	.748**	.662**	.576**	.752**	1

**correlation is significant at the 0.01 level (2-tailed)

From Table.8, it can be seen that there is a high degree of correlation between system success with information quality and students' satisfaction. System usage has a low degree of correlation with student satisfaction.

Table. 9 (a), (b), (c) & (d) Regression Analysis

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	System success	…	Enter

[a] Dependent Variable: Student Satisfaction
[b] All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R square	Std. Error of the Estimate
1	.752[a]	.566	.564	1.851

[a] Predictors: (Constant), System Usage, Services Quality, Information Quality

ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	964.864	1	964.864	281.665	.000[b]
Residual	739.925	216	3.426		
Total	1704.789	217			

[a]Dependent Variable: Student Satisfaction
[b]Predictors: (Constant), System Usage, Services Quality, Information Quality

Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std.Error	Beta		
(constant)	3.011	.361		8.345	.000
System Success	.501	.030	.752	16.783	.000

[a]Dependent Variable: Student Satisfaction

From the F-Table, it can be observed that the p-value < .05, and from the coefficient table, it can be seen that the p-value of system success is less than .05. So hence the derived linear regression can be written as follows:
StSa = 3.011 + .501 SyS where StSa is Student Satisfaction and SyS is System Success
It can be interpreted that there is an impact of system success on student satisfaction. It can be mathematically written as follows:

$$StSa = f_1 (SyS) \ldots\ldots\ldots (Equation.1)$$

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Table. 10 (a), (b), (c) & (d) Regression Analysis
Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Information Quality, Services Quality, System Usage	…	Enter

[a] Dependent Variable: System Success

[b] All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R square	Std. Error of the Estimate
1	.813[a]	.661	.657	2.468

[a] Predictors: (Constant), Services Quality, Information Quality

ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	2545.849	3	848.616	139.370	.000[b]
Residual	1303.032	214	6.089		
Total	3848.881	217			

[a]Dependent Variable: System Success
[b]Predictors: (Constant), System Usage, Services Quality, Information Quality

Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std.Error	Beta		
(constant)	-2.186	.781		-2.800	.006
Information Quality	.569	.061	.482	9.297	.000
Service Quality	.332	.056	.297	5.902	.000
System Usage	.339	.090	.181	3.743	.000

[a]Dependent Variable: Student Satisfaction

From the F-Table, it can be observed that the p-value < .05 and hence the derived linear regression can be written as follows:
$SyS = -2.186 + .569\,IQ + .332\,SQ + .339\,SU$ where SyS is the System Success, IQ is the Information Quality, SQ is the Service Quality, and SU is System Usage.

i.e. there is an impact of Information Quality, Service Quality, and System Usage on System Success. It can be mathematically written as follows:

$$SyS = f_2\,(IQ, SQ, SU) \ldots\ldots.. \text{(Equation.2)}$$

Combining both the equations (1) and (2), it can be stated as follows:
$StSa = f_2 \circ f_1\,(IQ, SQ, SU) = g\,(IQ, SQ, SU).$

In other words, it can be said that Student satisfaction is a function of Information Quality, System Quality, and System Usage.

Conclusion
Among the information quality statements, most of the respondents selected 'The system contains data that is related to learning' as first, followed by 'The system gives appropriate information' and 'the system offers data that is everything you need'.   Among the System quality statements, most of the respondents selected 'The professional services staff had enough experience to answer the questions in relates to the system' as first followed by 'When faced with any issues related to the e-learning system, professional services staff provided personal attention' and 'Responsible services staff performed system-related services at the time promised'. Among the System usage statements, most of the respondents selected 'I use the system regularly'

as first followed by 'I am dependent on the system' and 'I only use the system when it is necessary for learning'. Among the Student satisfaction statements, most of the respondents selected 'I believe the system is useful' as first followed by 'I do not have a good opinion about how the system operates' and each 'Overall I am happy with the system'. Among the System Success statements, most of the respondents selected 'The system quality was essential and useful in helping me towards success' as first, followed by 'The system had a beneficial influence on my learning' and 'The system's output was fine'.

Further, it was observed that there was an impact of system success on student satisfaction and also there was an impact of Information Quality, Service Quality, and System Usage on System Success. Therefore, it can be considered that there was an indirect influence of Information Quality, Service Quality, and System Usage on System Success on Students Satisfaction. Thus it can be concluded the experience through the e-learning system determines improvement towards academic knowledge and expertise.

It is concluded that as most of the students opined, the HEIs should keep improving their services which need to be considered to provide their services enhancing the features and the facilities to increase student satisfaction. The results of this study are compatible with earlier studies such as Cidral et al. (2018), Mammo & Ngulube (2019), and Shehzadi et al., (2020) where they found there is a clear relationship between quality of factors and students' satisfaction.

Suggestions

It is suggested that the e-learning system must be monitored and the students should be taught how to use these systems properly. It is necessary that the knowledge of system usage, even for petty things, may make a greater impact and make a big difference in what they experience as the experience without knowledge may land the students in difficulty. This study has provided insights into remote e-learning systems of higher education institutions in understanding the impact of the system used on student satisfaction. This will help them to improve the e-learning system.

Though the opinion cannot be ignored, it is also noted that a majority of the students do not have sufficient hands-on experience in dealing with the e-learning system and thus need to be trained before their join the e-learning system. But in general, this study helps HEIs to understand the student's perception of remote e-learning system for future improvements.

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